PCI-1202

2-Port AMONet™ RS-485 Master Card

User Manual

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Product Warranty (2 years)

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This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

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1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

Technical Support and Assistance

Step 1. Visit the Advantech web site at **www.advantech.com/support** where you can find the latest information about the product.

Step 2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
- Product name and serial number
- Description of your peripheral attachments
- Description of your software (operating system, version, application software, etc.)
- A complete description of the problem
- The exact wording of any error messages

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

In addition to this User Manual, the package should also include the following items:

1. PCI-1202: 2-Port AMONet RS-485 Master Card
2. Advantech Driver Disc

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CHAPTER 1

Introduction

This chapter gives an overview of the product features, applications, and specifications for PCI-1202

Sections include:

- Card Description
- Features
- Specifications
- Supported Software
- Application Development

Chapter 1 Introduction

The Advantech PCI-1202 motion controller is designed for users who need to develop powerful applications quickly and easily. PCI-1202 is a standard PCI-Bus motion controller with a high-speed real-time network extension called AMONet. Advantech optimizes the software to help you get your advanced motion profiles as quickly as possible.

AMONet is a new series of products designed for versatile automation applications especially with distributed motion control requirements.

PCI-1202 is equipped with 2 master rings, and each master ring can connect with up to 64 slave modules. There are 2 categories of slave modules; one is for 1-axis motion control; the second is for digital I/O with 4 types, 32-IN, 32-OUT, 16-IN & 16-0UT and 24-IN & 8-OUT.

1.1 Card Description

The PCI-1202 is a Standard AMONet PCI-Bus Interface Master Card.

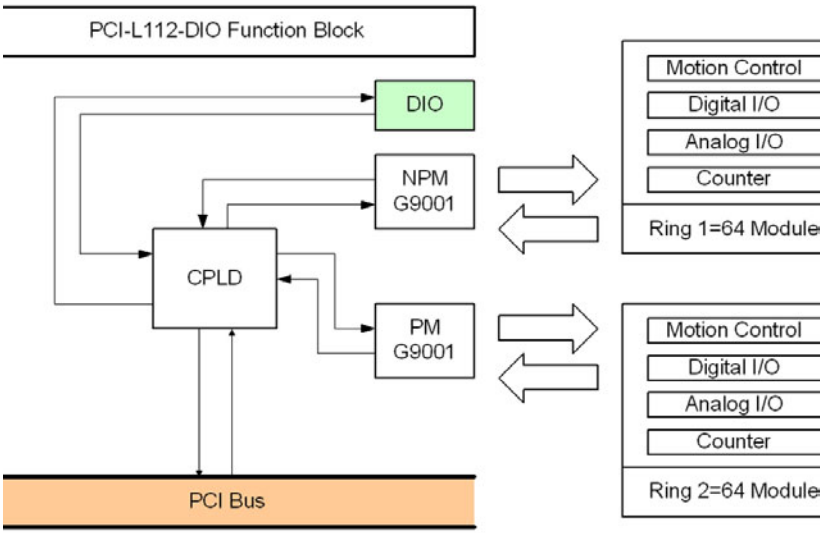


Figure 1.1: Functional Block Diagram of PCI-1202

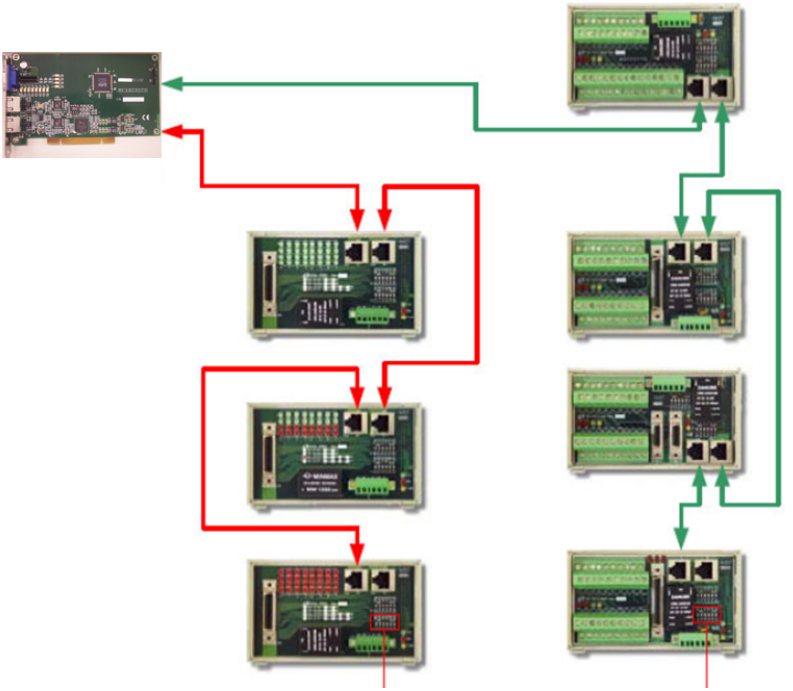


Figure 1.2: PCI-1202 Applications

1.2 Features

- 2 Rings of AMONet master
- Programmable baud-rate up to 20 Mbps transfer rate
- Max. 128 AMONet digital slave modules support
- Easy installation with RJ45 phone jack and LED diagnostic

1.3 Specifications

- **Number of Rings:** 2
- **Transmission Speeds:** 2.5, 5, 10, 20 Mbps with automatic data flow control
- **Serial Interface:** half duplex RS-485 with transformer isolation
- **Cable Type:** CAT5 UTP/STP Ethernet cable
- **Surge Protection:** 10 kV
- **Communication Distance:** Max. 100 m (20 Mbps/32 slave modules)
- **Communication Slave Module Capacity:** 2 Rings with Max. 128 (1 ring has 64 slaves)
- **Digital Input:** 8-Ch isolated, sink type, 0-24 V DC, Max. 50 mA current , 10 mA sink current
- **Digital Output:** 4-Ch isolated, open collector type, 5~30 V DC voltage Max. 10 mA sink current (open collector)
- **PCI Specification:** 2.2, supports 32-bit, 3.3 or 5 V DC operation
- **Power Consumption:** +5 V DC at 0.5 A typical
- **Working Temperature:** 0 to 60° C

1.4 Supported Software

1.4.1 Programming Library

For customers who are writing their own programs, we provide BCB++/ VB/VC++ programming libraries and Windows 2000/XP DLL for PCI-1202. These function libraries are shipped with the board. There is also support for Windows 2000/XP, and Embedded XP.

1.4.2 EzLINK

EzLINK is a utility software tool for AMONet. It is usually used offline to test and debug the communication status, I/O slave module operation and motion slave operation.

1.5 Application Development

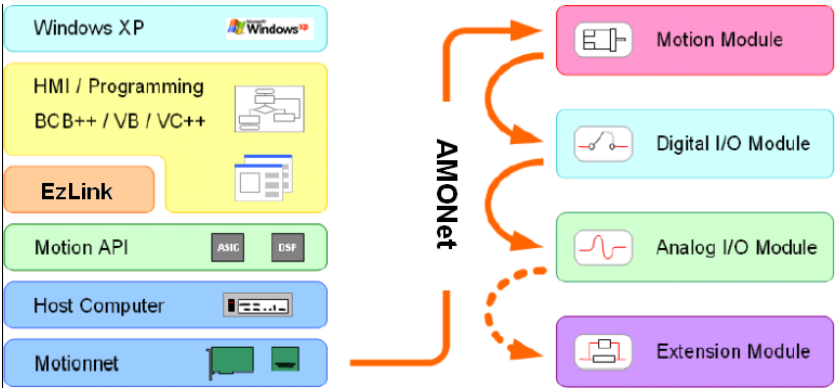


Figure 1.3: Application Development

Fig. 1-4 is a flow chart that illustrates the recommended process in using this manual to develop an application. Refer to the related chapters for details of each step.

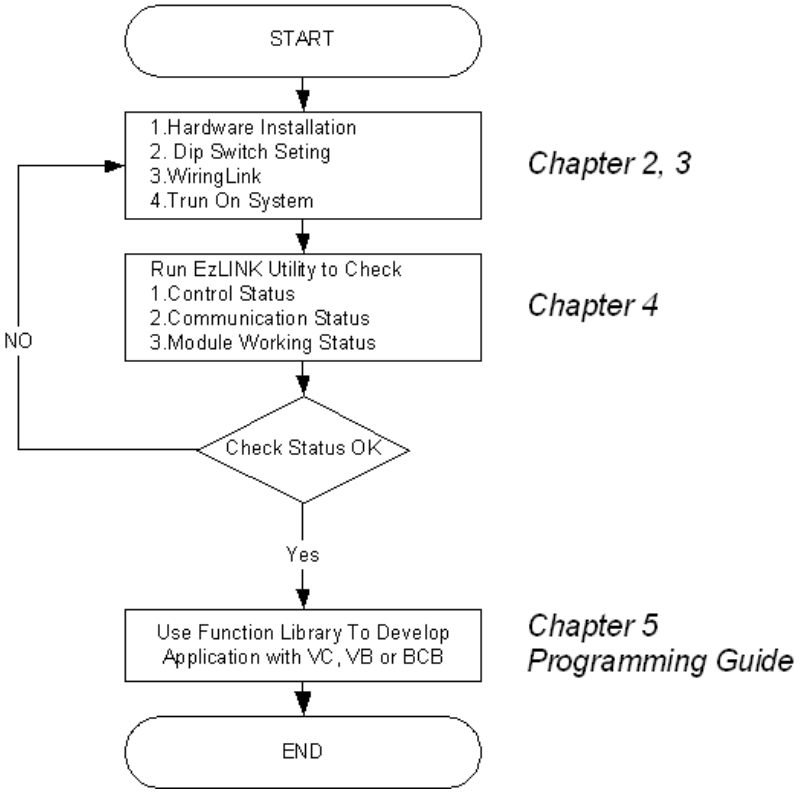


Figure 1.4: Flow Chart for Building an Application

CHAPTER 2

Installation

This chapter describes how to install PCI-1202.

Sections include:

- Check What You Have
- PCB Board Layout
- Hardware Installation
- Driver Installation
- Connector Descriptions

Chapter 2 Installation

This chapter describes how to install the PCI-1202. Please follow these steps below to install the PCI-1202.

- Check what you have (section 2.1)
- Check PCB Board (section 2.2)
- Install hardware (section 2.3)
- Install software driver (section 2.4)

Understanding the I/O signal connections and their operation (chapter 3,4)

Understanding the connectors' pin assignments (the rest of the sections) and wiring the connections

2.1 Check What You Have

In addition to this User Manual, the package should also include the following items:

- PCI-1202: 2-Port AMONet RS-485 Master Card
- Advantech Driver Disc
- An optional terminal board for wiring purposes. (If a different model is ordered.)

If any of these items are missing or damaged, contact the dealer from whom you purchased the product. Save the shipping materials and carton in case you want to ship or store the product in the future.

2.2 PCB Board Layout

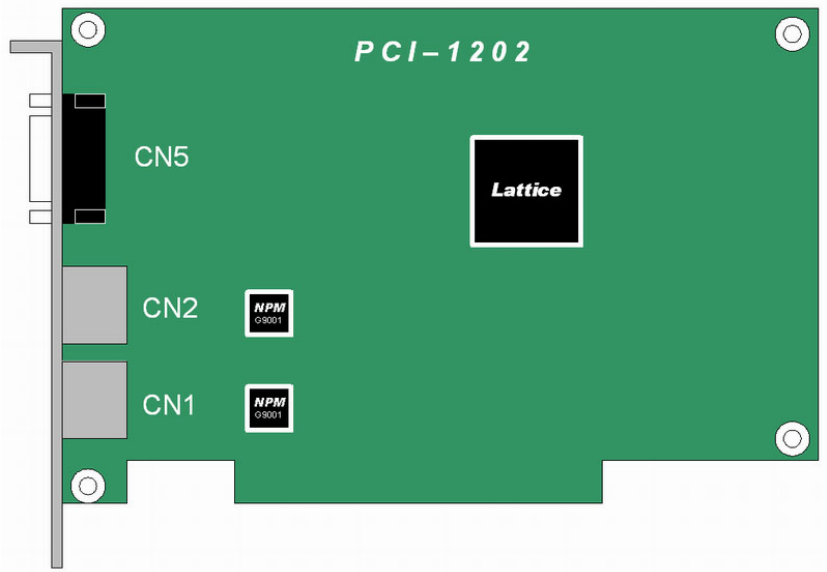


Figure 2.1: PCB Layout of the PCI-1202

Name	Description
PCI-1202	
CN1	RJ-45, AMONet extension connector
CN2	RJ-45, AMONet extension connector
CN5	DSUB 15-pin digital I/O connector

2.3 Hardware Installation

2.3.1 Hardware Configuration

PCI-1202 is a standard extension device of PCI for PC systems. All the functions in a base system, such as the memory allocation, I/O port locations, and the address assignment, should be setup by following the manual.

2.3.2 PCI-Slot Socket Selection

Most PCs have both PCI and ISA slots. Don't force the PCI-1202 card into an ISA slot. PCI-1202 can be only used in PCI slots.

2.3.3 Installation Procedure

1. Please read this manual first, and then setup the jumper and switch of the product in accordance to your needs.
2. Turn off your PC's power, and make sure the AC power is disconnected. Also turn off the power on all accessories (printer, modem, monitor, etc.) connected to the computer.
3. Open the chassis cover of the PC, and install the card. PCI-1202 can only be installed in a standard 32-bit PCI extension slot. It can't be used in a standard ISA or other extension slot.
4. Before handling PCI-1202, discharge any static buildup on your body which may damage the product.
5. Position PCI-1202 in the correct PCI slot, and fix it. Secure the card in place at the front PCB panel of the system unit by using screws removed from the socket.
6. When removing the product, be sure to cut off the power first. Then take PCI-1202 out of the system board.

2.3.4 Troubleshooting

If your system doesn't boot correctly, please turn it off and make sure the AC power is disconnected. Open the chassis cover of the PC and confirm that PCI-1202 is firmly attached in its socket, that screws are locked and PCI-1202 is set with correct jumper and switch configuration.

Please make sure the PC system is working correctly when PCI-1202 is removed. If the PC system is working correctly after removing PCI-1202, please follow standard installation steps to reinstall PCI-1202. If the system still can't boot correctly after the reinstallation of PCI-1202, please contact your supplier for support.

2.4 Driver Installation

Auto-Run from the Advantech Driver CD. Choose Driver Installation -> PCI-1202.

Follow the procedures of the installer.

After setup installation is completed, restart Windows.

2.5 Connector Descriptions

2.5.1 AMONet Extension

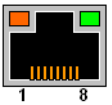


Figure 2.2: AMONet Extension

Pin	Label	Description
1	FG	Filed Ground
2	FG	Filed Ground
3	RS485+	High Speed RS-485 protocol
4	FG	Filed Ground
5	FG	Filed Ground
6	RS485-	High Speed RS-485 protocol
7	FG	Filed Ground
8	FG	Filed Ground

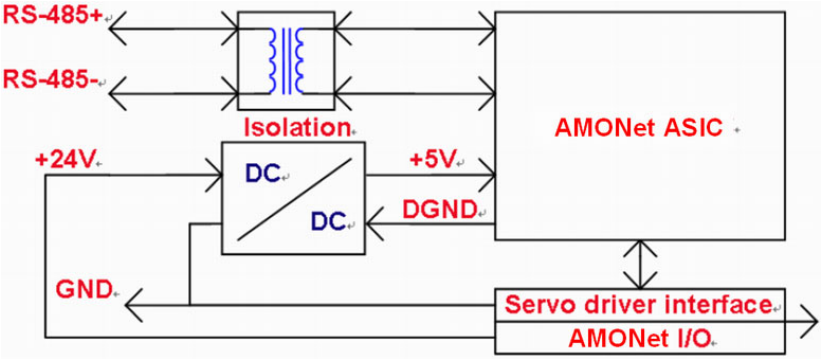


Figure 2.3: RS-485 Extension Port

2.5.2 Digital I/O Connector(CN5)

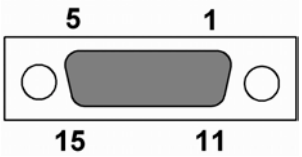


Figure 2.4: Digital I/O Connector

Pin	Label	Description
1	INPUT1	Digital Input #1
2	INPUT2	Digital Input #2
3	INPUT3	Digital Input #3
4	INPUT4	Digital Input #4
5	GND	Power Ground
6	INPUT5	Digital Input #5
7	INPUT6	Digital Input #6
8	INPUT7	Digital Input #7
9	INPUT8	Digital Input #8
10	N.C.	Reserved
11	OUTPUT1	Digital Output #1
12	OUTPUT2	Digital Output #2
13	OUTPUT3	Digital Output #3
14	OUTPUT4	Digital Output #4
15	GND	Power Ground

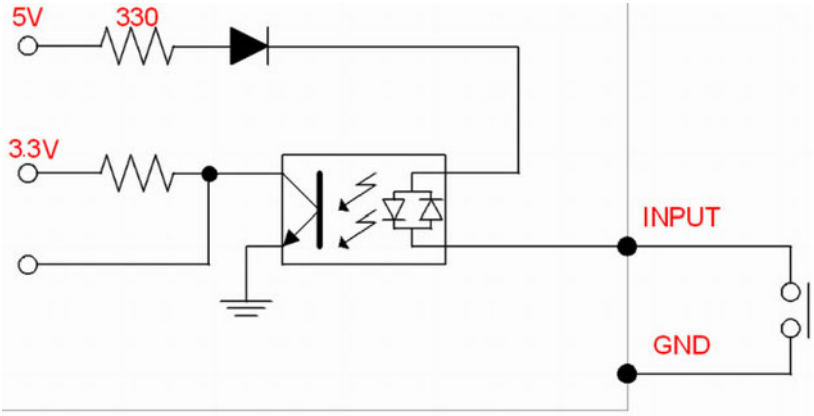


Figure 2.5: Digital Input Circuit

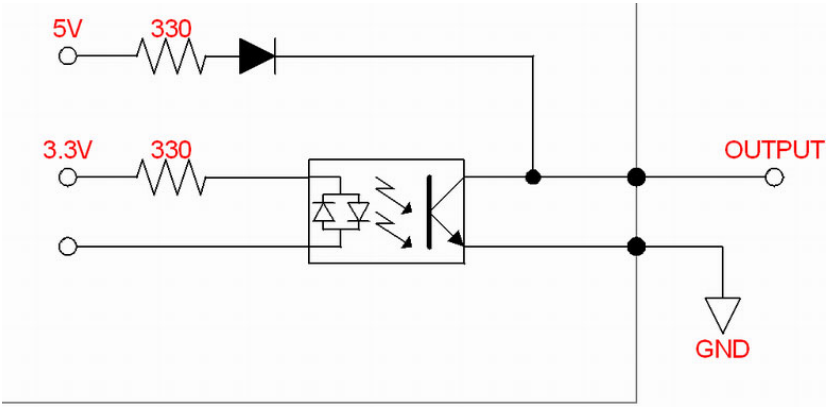


Figure 2.6: Digital Output Circuit

2.5.3 AMONet Extension Interface

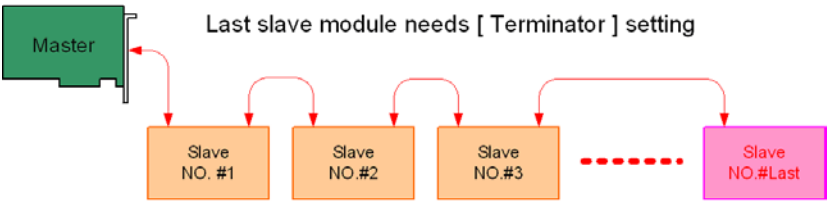


Figure 2.7: AMONet Slave Module Address Setting

CHAPTER 3

AMONet Extension Modules

Sections include:

- Installation and Removal of Extension Modules
- DIO Slave Module
- Motion Slave Modules

Chapter 3 AMONet Extension Modules

3.1 Installation and Removal of Extension Modules

3.1.1 Installation

Please make sure the extension (slave) modules have been plugged into the DIN rail correctly. Try to move the module by hand after installation. No vertical movement up and down will be possible if the installation is correct. Only horizontal movement right and left will be possible.

3.1.2 Removal

Please refer to figure 3.1 and proceed with the following steps.

1. Use a flat screwdriver
2. Plug this screwdriver into the bar on the right end
3. Push the screwdriver to pull out the bar
4. Slightly pull the slave module out of the DIN rail while keeping the screwdriver in its position pulling the bar. Make sure the module is no longer attached on the right side.
5. Follow the same steps 2 ~ 4 on the left side.
6. After steps 1 ~ 4 have been successfully completed for both sides, the slave module can be removed from the DIN rail.

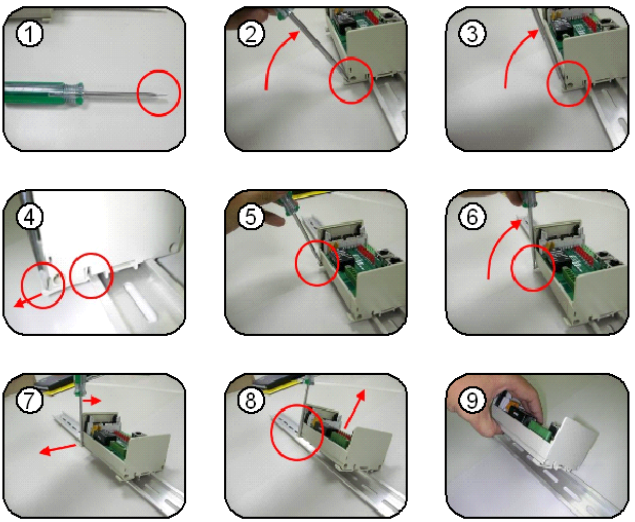


Figure 3.1: Installation and Removal of Extension Modules

3.2 DIO Slave Modules

3.2.1 Features

- DIN rail mounting (LxWxH): 124 x 72 x 53 mm
- Max. 20 Mbps transfer rate
- 3-Wire terminal board for actuator/sensor
- Easy installation with RJ45 phone jack and LED diagnostic
- Serial interface: half duplex RS-485 with transformer isolation

3.2.2 Specifications

- **Cable Type:** CAT5 UTP/STP Ethernet cable
- **Surge Protection:** 10 kV
- **Transmission Speed:** 2.5, 5, 10 and 20 Mbps
- **On-line module insertion and removal**
- **I/O Isolation Voltage:** 2.5 kVrms
- **Input Impedance:** 2.4 k/0.5 Ω, Input current: ±10 mA (Max)
- **Output Types:** NPN/PNP open collector Darlington transistors
- **Switch Capacity:** each output channel is 60 mA at 24 V DC
- **Response Time**: On to Off, about 180 µs; Off to On, about 1.2 µs
- **Power Supply:** +18 V DC to +30 V DC, consumption: 3 W typical
- **Operating Temperature:** 0 ~ 60° C

3.2.3 Products Introduction

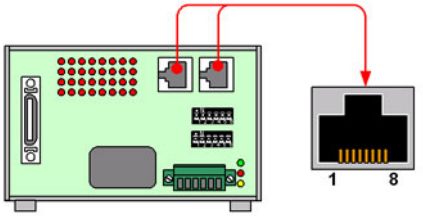
Figure 3.2: ADAM-375XX Products Series and ADAM-3936

There are two types of DIO slave modules, one is a 3-wire type called ADAM-37xx, and the other is a flat-cable type called ADAM-37xxF. For the 3-wire type slave, there is a PCL-10136M connector onboard. The ADAM-3936 wiring terminal will be used together with this type of slave. ADAM-3936 supports 3 screw terminals for each input and output. The ADAM-37xx is very suitable for system integration and quick development of machine prototypes.

ADAM-37xxF is an economic option for a DIO slave modules that is designed for customers that have their own I/O terminal boards.

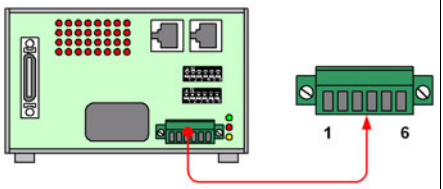
3.2.4 Common Connector Pin Definitions

Communication Conn. RJ-45



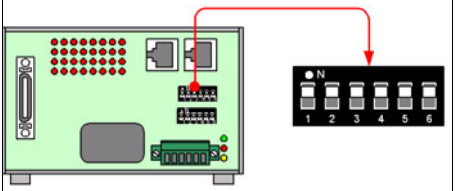
Pin	Label	Description
1	NC	Filed Ground
2	NC	Filed Ground
3	RS485+	High Speed RS-485 protocol
4	NC	Filed Ground
5	NC	Filed Ground
6	RS485-	High Speed RS-485 protocol
7	NC	Filed Ground
8	NC	Filed Ground

External Power Input connector



Pin	Label	Description
1	24V	DC 24V
2	GND	DC 24V Ground
3	FG	Field Ground
4	24V	DC 24V
5	GND	DC 24V Ground
6	FG	Field Ground

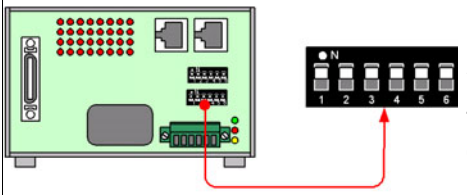
ID Setting DIP Switch



Pin	Label	ON	OFF
1	A5	1	0
2	A4	1	0
3	A3	1	0
4	A2	1	0
5	A1	1	0
6	A0	1	0

Note: Node Number= 32xA5+16xA4+8xA3+4xA2+2xA1 +A0

Configuration Settings

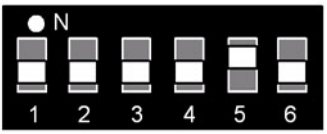


Pin	Label	Description	ON	OFF
1	B1	*Baud-Rate Setting	1	0
2	B0	*Baud-Rate Setting	1	0
3	TD	Time-out Status Latch		
4	TM	Watchdog Mode		
5	BK	Reserved		
6	TR	Terminate Resistance	Enable	Disable

How to use Baud-Rate Setting

B0	B1	Baud-Rate Setting
OFF	OFF	1/4 System Clock
OFF	ON	1/8 System Clock
ON	OFF	1/16 System Clock
ON	ON	1/32 System Clock

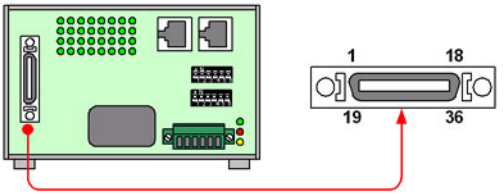
Note:
default system clock = 80 Mhz



Default Setting

3.2.5 Specific Connector Pin Definitions

ADAM-375x Pin Definitions



ADAM-3752

Pin	Label	Pin	Label
1	IN_00	19	IN_20
2	IN_01	20	IN_21
3	IN_02	21	IN_22
4	IN_03	22	IN_23
5	IN_04	23	IN_24
6	IN_05	24	IN_25
7	IN_06	25	IN_26
8	IN_07	26	IN_27
9	GND	27	GND
10	GND	28	GND
11	IN_10	29	IN_30
12	IN_11	30	IN_31
13	IN_12	31	IN_32
14	IN_13	32	IN_33
15	IN_14	33	IN_34
16	IN_15	34	IN_35
17	IN_16	35	IN_36
18	IN_17	36	IN_37

ADAM-3758

Pin	Label	Pin	Label
1	IN_00	19	IN_20
2	IN_01	20	IN_21
3	IN_02	21	IN_22
4	IN_03	22	IN_23
5	IN_04	23	IN_24
6	IN_05	24	IN_25
7	IN_06	25	IN_26
8	IN_07	26	IN_27
9	GND	27	GND
10	GND	28	GND
11	IN_10	29	OUT_30
12	IN_11	30	OUT_31
13	IN_12	31	OUT_32
14	IN_13	32	OUT_33
15	IN_14	33	OUT_34
16	IN_15	34	OUT_35
17	IN_16	35	OUT_36
18	IN_17	36	OUT_37

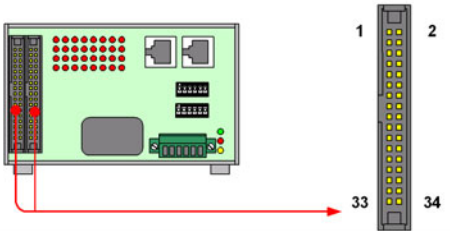
ADAM-3756

Pin	Label	Pin	Label
1	IN_00	19	OUT_20
2	IN_01	20	OUT_21
3	IN_02	21	OUT_22
4	IN_03	22	OUT_23
5	IN_04	23	OUT_24
6	IN_05	24	OUT_25
7	IN_06	25	OUT_26
8	IN_07	26	OUT_27
9	GND	27	GND
10	GND	28	GND
11	IN_10	29	OUT_30
12	IN_11	30	OUT_31
13	IN_12	31	OUT_32
14	IN_13	32	OUT_33
15	IN_14	33	OUT_34
16	IN_15	34	OUT_35
17	IN_16	35	OUT_36
18	IN_17	36	OUT_37

ADAM-3754

Pin	Label	Pin	Label
1	OUT_00	19	OUT_20
2	OUT_01	20	OUT_21
3	OUT_02	21	OUT_22
4	OUT_03	22	OUT_23
5	OUT_04	23	OUT_24
6	OUT_05	24	OUT_25
7	OUT_06	25	OUT_26
8	OUT_07	26	OUT_27
9	GND	27	GND
10	GND	28	GND
11	OUT_10	29	OUT_30
12	OUT_11	30	OUT_31
13	OUT_12	31	OUT_32
14	OUT_13	32	OUT_33
15	OUT_14	33	OUT_34
16	OUT_15	34	OUT_35
17	OUT_16	35	OUT_36
18	OUT_17	36	OUT_37

ADAM-375xF Pin Definitions



ADAM-3754F

CN1

Pin	Label	Pin	Label
1	OUT_00	2	+24V
3	OUT_01	4	GND
5	OUT_02	6	+24V
7	OUT_03	8	GND
9	OUT_04	10	+24V
11	OUT_05	12	GND
13	OUT_06	14	+24V
15	OUT_07	16	GND
17	OUT_10	18	+24V
19	OUT_11	20	GND
21	OUT_12	22	+24V
23	OUT_13	24	GND
25	OUT_14	26	+24V
27	OUT_15	28	GND
29	OUT_16	30	+24V
31	OUT_17	32	GND
33	FG	34	FG

ADAM-3754F

CN2

Pin	Label	Pin	Label
1	OUT_20	2	+24V
3	OUT_21	4	GND
5	OUT_22	6	+24V
7	OUT_23	8	GND
9	OUT_24	10	+24V
11	OUT_25	12	GND
13	OUT_26	14	+24V
15	OUT_27	16	GND
17	OUT_30	18	+24V
19	OUT_31	20	GND
21	OUT_32	22	+24V
23	OUT_33	24	GND
25	OUT_34	26	+24V
27	OUT_35	28	GND
29	OUT_36	30	+24V
31	OUT_37	32	GND
33	FG	34	FG

ADAM-3752F

CN1

Pin	Label	Pin	Label
1	IN_00	2	+24V
3	IN_01	4	GND
5	IN_02	6	+24V
7	IN_03	8	GND
9	IN_04	10	+24V
11	IN_05	12	GND
13	IN_06	14	+24V
15	IN_07	16	GND
17	IN_10	18	+24V
19	IN_11	20	GND
21	IN_12	22	+24V
23	IN_13	24	GND
25	IN_14	26	+24V
27	IN_15	28	GND
29	IN_16	30	+24V
31	IN_17	32	GND
33	FG	34	FG

ADAM-3752F

CN2

Pin	Label	Pin	Label
1	IN_20	2	+24V
3	IN_21	4	GND
5	IN_22	6	+24V
7	IN_23	8	GND
9	IN_24	10	+24V
11	IN_25	12	GND
13	IN_26	14	+24V
15	IN_27	16	GND
17	IN_30	18	+24V
19	IN_31	20	GND
21	IN_32	22	+24V
23	IN_33	24	GND
25	IN_34	26	+24V
27	IN_35	28	GND
29	IN_36	30	+24V
31	IN_37	32	GND
33	FG	34	FG

ADAM-3756F				ADAM-3756F			
CN1				CN2			
Pin	**Label**	**Pin**	**Label**	**Pin**	**Label**	**Pin**	**Label**
1	IN_00	2	+24V	1	OUT_00	2	+24V
3	IN_01	4	GND	3	OUT_01	4	GND
5	IN_02	6	+24V	5	OUT_02	6	+24V
7	IN_03	8	GND	7	OUT_03	8	GND
9	IN_04	10	+24V	9	OUT_04	10	+24V
11	IN_05	12	GND	11	OUT_05	12	GND
13	IN_06	14	+24V	13	OUT_06	14	+24V
15	IN_07	16	GND	15	OUT_07	16	GND
17	IN_10	18	+24V	17	OUT_10	18	+24V
19	IN_11	20	GND	19	OUT_11	20	GND
21	IN_12	22	+24V	21	OUT_12	22	+24V
23	IN_13	24	GND	23	OUT_13	24	GND
25	IN_14	26	+24V	25	OUT_14	26	+24V
27	IN_15	28	GND	27	OUT_15	28	GND
29	IN_16	30	+24V	29	OUT_16	30	+24V
31	IN_17	32	GND	31	OUT_17	32	GND
33	FG	34	FG	33	FG	34	FG

3.2.6 Digital Input Signal Connection

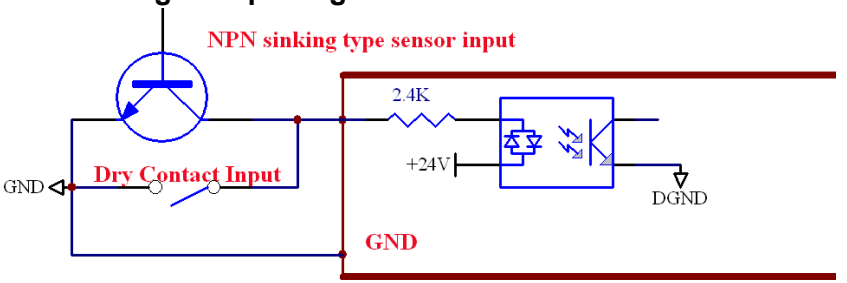


Figure 3.3: NPN Sinking Type Input

IN1 & IN2 (Digital Input)

Digital input for each axis is shown in table 3.1.

Table 3.1: DI Pins	
Label	**Description**
GND	External Ground
DI	General DI

3.2.7 Digital Output Signal Connection

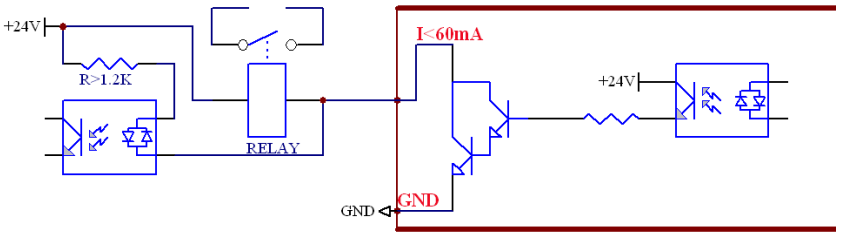


Figure 3.4: Relay Type Output

OUT1 & OUT2 (Digital Output)

Digital output for each axis is designed for general-purpose output function. Please refer to the following table 3.2.

Table 3.2: OUT1&OUT2 Pins

Label	Description
GND	External Ground
DO	Digital Outputs

3.3 Motion Slave Modules

3.3.1 Features

- DIN rail mounting L x W x H: 124 x 72 x 53 mm)
- Max. 20 Mbps transfer rate
- Max. 6.5 MHz, 1-Axis pulse output
- 28-bit counter for incremental encoder
- Programmable acceleration and deceleration time
- T-curve and S-curve velocity profiles support
- Change speed on-the-fly
- Simultaneously start/stop on multiple motion control modules (reserved)
- Easy installation with RJ45 phone jack and LED diagnostic
- Easy installation for servo or stepping motor driver

3.3.2 Specifications

Series interface: Half duplex RS-485 with transformer isolation

Cable type: CAT5 UTP/STP Ethernet cable

Surge protection: 10 kV

Transmission speed: 2.5, 5, 10 and 20 Mbps

Programmable Pulse output mode: ±OUT/DIR, ±CW/CCW, ±A/B phase

Programmable pulse command speed: Max 6.5Mpps / Min 0.05pps

Position range: 28 bits (±134,217,728 pulses)

Home return mode: 13 types

Velocity profiles: T-curve, S-curve

Counter for encoder feedback signals: 28 bits up/down

Position latch input: LTC

Position compare output: CMP

Incremental encoder input: ±EA, ±EB

Encoder index signal input: ±EZ

Machine interface: PEL, MEL, ORG, SLD

Servo driver interface: ALM, RDY, SVON, INP, ERC

Simultaneous start/stop motion input: STA, STP (Reserved)

LED indicator: PWR, RUN, ERR, PEL, MEL, ORG, SLD

Power supply: +18V DC to +30V DC, consumption: 3W typical

Operating temperature: 0 to 60° C

3.3.3 Product Introductions

Figure 3.5: ADAM-32xx Products Series

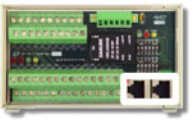
Unlike traditional motion card solutions, AMONet supports remote motion slave modules for extended multiple-axis applications. All these extended motion slave modules are connected serially by a simple CAT5 cable with RJ45 connectors. This reduces wiring between the motion driver and controller and provides a motion control system that is very suitable for highly integrated machine automation applications.

AMONet supports driver-specific motion slave modules such as the motion slave module for Mitsubishi J2-Super series Driver/Motor, and Panasonic Minas A type servo driver/motor.

Please select the matching cable PCL-10120M or PCL-10150M and plug this cable into both the motion driver and motion slave module. AMONet also supports general purpose motion slave modules for general driver/motors including step driver/motors. This general-purpose motion slave module is designed with many screw terminals onboard to support easy wiring. Please refer to the relevant installation guides.

3.3.4 Common Connector Pin Definitions

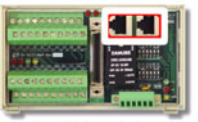
Communication Connector RJ-45



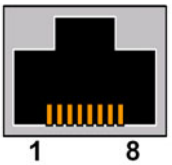
ADAM-3210

ADAM-3211/PMA

ADAM-3212/J2S

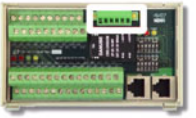


ADAM-3213/YS2



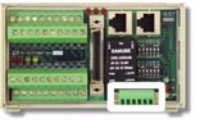
Pin	Label	Description
1	NC	Filed Ground
2	NC	Filed Ground
3	RS-485+	High Speed RS-485 protocol
4	NC	Filed Ground
5	NC	Filed Ground
6	RS-485-	High Speed RS-485 protocol
7	NC	Filed Ground
8	NC	Filed Ground

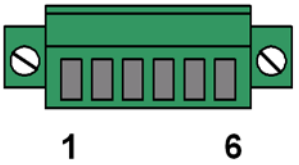
External Power Input Connector


ADAM-3210

ADAM-3211/PMA

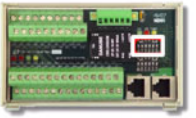
ADAM-3212/J2S


ADAM-3213/YS2

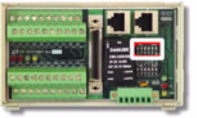


Pin	Label	Description
1	24V	DC 24V
2	GND	DC 24V Ground
3	FG	Field Ground
4	24V	DC 24V
5	GND	DC 24V Ground
6	FG	Field Ground

Slave ID Setting DIP Switch

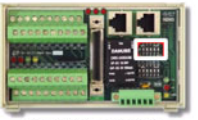


ADAM-3210

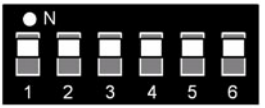


ADAM-3211/PMA

ADAM-3212/J2S



ADAM-3213/YS2



Pin	Label	ON	OFF
1	A5	1	0
2	A4	1	0
3	A3	1	0
4	A2	1	0
5	A1	1	0
6	A0	1	0

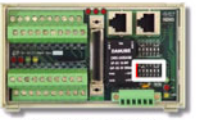
Note: Node Number=32xA5+16xA4+8xA3+4xA2+2xA1+A0

Configuration Setting

ADAM-3210

ADAM-3211/PMA

ADAM-3212/J2S



ADAM-3213/YS2

Switch	Label	Description	ON	OFF
1	B1	Baud-Rate Setting	1	0
2	B0		1	0
3	TD	Time-Out Status Latch	Enable	Disable
4	TM	Watchdog Mode	Enable	Enable
5	*BK	*Break and Rescan Communication	Enable	Disable
6	TR	Terminate Resistance	Enable	Disable

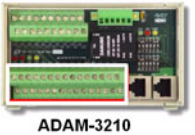
*BK function is reserved.

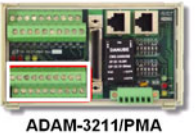
How to Use the Baud-Rate Setting

B0	B1	Baud-Rate Setting
OFF	OFF	1/4 System Clock
OFF	ON	1/8 System Clock
ON	OFF	1/16 System Clock
ON	ON	1/32 System Clock

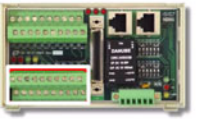
Note: default system clock = 80 MHz

CN1 Connector Pin Descriptions


ADAM-3210

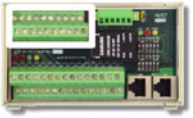

ADAM-3211/PMA

ADAM-3212/J2S

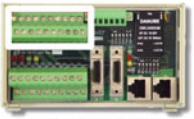

ADAM-3213/YS2

Label	General Description
24V	DC 24V Power Output
GND	Ground
PEL	End Limit Signal (+)
MEL	End Limit Signal (-)
ORG	Home Signal Input
SLD	Ramp-Down Signal Input
LTC+	Latch Signal Input (+)
LTC-	Latch Signal Input (-)
EMG+	Emergency Stop Input (+)
EMG-	Emergency Stop Input (-)
PCS	Position Change Signal Input (Reserved)
CLR	Clear Position Command Counter Signal Input (Reserved)
Label	**ADAM-3210 Description**
OUT+	Pulse Signal Output (+)
OUT-	Pulse Signal Output (-)
DIR+	Direction Signal Output(+)
DIR-	Direction Signal Output(-)
EA+	Encoder A Phase (+)
EA-	Encoder A Phase (-)
EB+	Encoder B Phase (+)
EB-	Encoder B Phase (-)
EZ+	Encoder Z Phase (+)
EZ-	Encoder Z Phase (-)

CN2 Connector Pin Descriptions


ADAM-3210

ADAM-3211/PMA

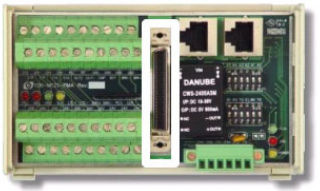

ADAM-3212/J2S

ADAM-3213/YS2

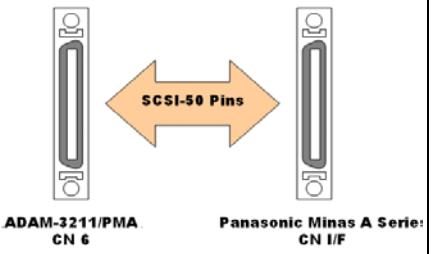
Label	General Description
24V	DC 24V Power Output
GND	Ground
STA	Simultaneous Start Input (Reserved)
STP	Simultaneous Stop Input (Reserved)
CMP	Position Compare Output
BSY	Motion Busy Signal Output
BRK	Machinery Break Signal Input (106-M131-J2S)
BRK+	Machinery Break Signal (+) Input
BRK-	Mechanical Brake Release Signal (-) Input
IN1	Digital Input Signal #1
IN2	Digital Input Signal #2
OUT1	Digital Output Signal #1
OUT2	Digital Output Signal #2
Label	**ADAM-3210 Description**
RDY	Servo Ready Signal input
SVON	Servo On Signal Output
ALM	Servo Alarm Signal Input
INP	In-Position Signal Input
ERC	Clear Servo Error Counter Signal Output
ALMC	Servo Alarm Clear Signal Output

3.3.5 1-to-1 Cable Information

ADAM-3211/PMA



ADAM-3211/PMA



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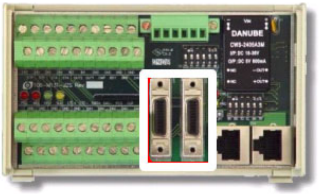

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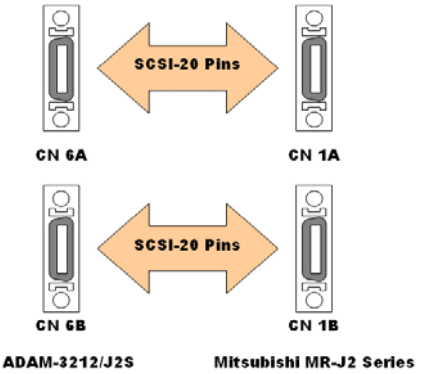
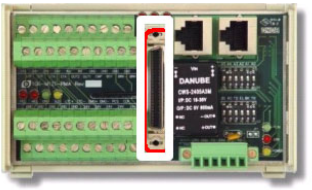


ADAM-3213/YS2



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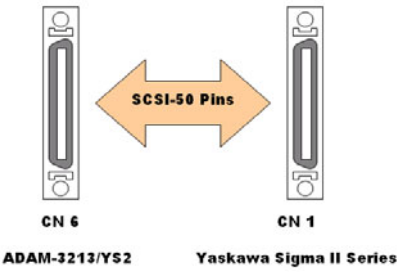

3.3.6 Motion Signal Connection

Digital Input (1)

This section includes STA, STP, PCS, CLR, PEL, MEL, ORG, SLD, ALM, INP, RDY, IN1 and IN2 signal:

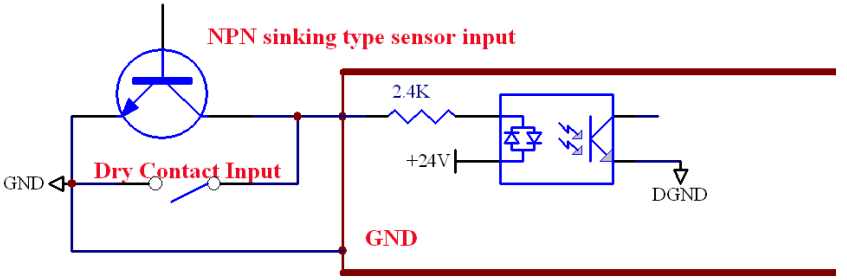

Figure 3.6: NPN Sinking Type Input

STA (Simultaneous Start)

STA is used to start all the motors connected to the same ring simultaneously. Please refer to table 3.3 for detailed information.

Table 3.3: STA Pins

Label	Description
STA	Simultaneous Start Signal
GND	External Ground

STP (Simultaneous Stop)

STP is used to stop all the motors connected to the same ring simultaneously. Please refer to table 3.4 for detailed information.

Table 3.4: STP Pins

Label	Description
STP	Simultaneous Stop Signal
GND	External Ground

PCS (Position Change)

This function is conserved for the further application, not supported by the current dynamic link library (DLL) driver now.

CLR (Clear Position Command Counter)

This function is conserved for the further application, not supported by the current dynamic link library (DLL) driver now.

PEL & MEL (Plus End Limit / Minus End Limit)

There are two end-limit signals called PEL and MEL. The default setting is Normal-Close type signals from external sensors (Can be set by SW2). PEL indicates the limit of motion in the plus direction and MEL indicates the limit of motion in the minus direction. The relative signal names, pin number are shown in the following table.

Table 3.5: PEL and MEL Pins

Label	Description
GND	External Ground
PEL	Plus End Limit
MEL	Minus End Limit

ORG (Origin)

The origin signal is necessary when the position feedback is of the incremental type or if no feedback encoders are used. The origin signals are used to indicate the origin of the system. Please refer to table 3.6 for detailed information.

Table 3.6: ORG Pins

Label	Description
GND	External Ground
ORG	ORG signal

SLD (Slow Done)

The SLD signals are used to help the axis decelerate to stop by hardware. Please refer to table 3.7 for descriptions of the signal name, pin number.

Table 3.7: SLD Pins	
Label	**Description**
GND	External Ground
SLD	SLD Signal

ALM (Servo Alarm)

ALM- input signal from ALM signal at servo driver. The servo driver will issue ALM output when it is under abnormal operation or overload. Please refer to table 3.8 for a description.

Table 3.8: Table 3.8: ALM Pins	
Label	**Description**
GND	External Ground
ALM	Servo ALM input

INP (Servo In Position)

INP is an input signal at PCI-1202 and is used to read the INP status inside servo driver. Please refer to table 3.9 for descriptions.

Table 3.9: INP Pins	
Label	**Description**
GND	External Ground
INP	Servo In-Position Input

RDY (Driver Ready)

RDY is an input signal and is used to read the RDY signal at servo driver. Please refer to table 3.10.

Table 3.10: RDY Pins	
Label	**Description**
GND	External Ground
RDY	Servo RDY input

IN1 & IN2 (Digital Input)

Digital input is shown in table 3.11.

Table 3.11: DI Pins	
Label	**Description**
DI	General DI
GND	External Ground

Digital Input (2)

This section includes LTC+, LTC-, EMG+, EMG-, BRK+ and BRK- signal:

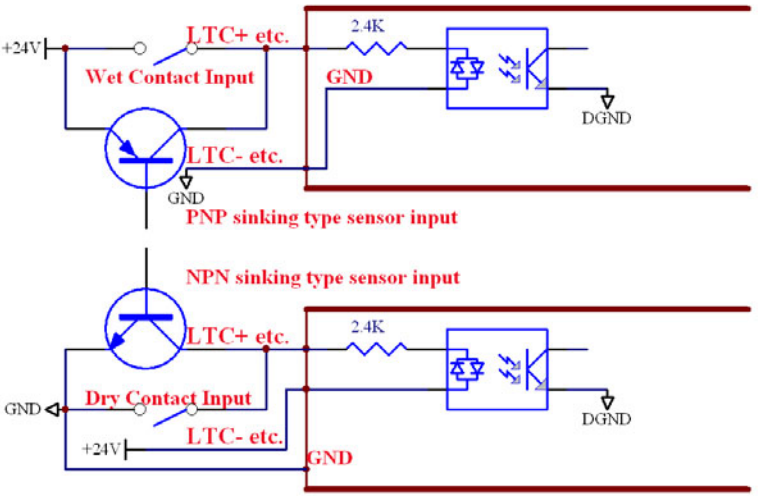

Figure 3.7: PNP/NPN Sinking Type Input

LTC+ & LTC- (Counter Latch)

LTC is used to latch the value in the counter when the LTC input is active. Table.3.12 lists the signal name and pin number.

Table 3.12: LTC Pins	
Label	**Description**
LTC+	LTC- Input
LTC-	LTC- Input
GND	External Ground

EMG+ & EMG- (Emergency Stop)

EMG is shown in table 3.13.

Table 3.13: EMG Pins	
Label	**Description**
EMG+	Emergency Stop
EMG-	Emergency Stop
GND	External Ground

BRK+ (Machinery Break Signal) & BRK- (Machinery Break Release Signal)

BRK+ and BRK- is used to control the motor break function. Table.3.14 lists the signal name, pin number and axis number.

Table 3.14: BRK+/BRK- Pins	
Label	**Description**
BRK+	Machinery Break Signal
BRK-	Machinery Break Release Signal
GND	External Ground

Digital Output

This section includes SVON, ERC, RALM, CMP, OUT1 and OUT2 signal:

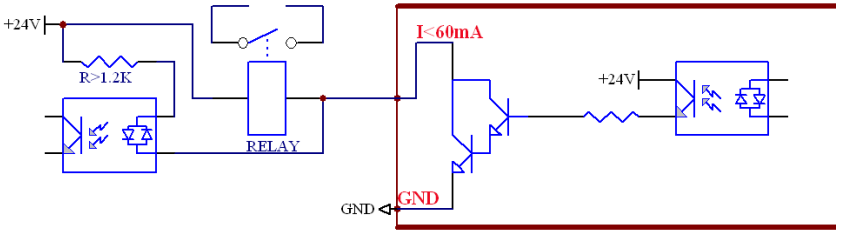

Figure 3.8: Relay Type Output

SVON (Servo On)

SVON is an output signal from PCI-1202 and is used to make driver servo-on to hold the motor. Please refer to table 3.15.

Table 3.15: SVON Pins

Label	Description
SVON	SVON Output
GND	External Ground

ERC (Reset Driver error counter/Deviation Counter Clear)

ERC output will be active when the following conditions are activated.

- Homing is complete
- PEL/MEL is active
- ALM is active
- User issues EMG by software

For safety reasons, please issue ERC before SVON. Please refer to table 3.16.

Table 3.16: ERC Pins

Label	Description
ERC	Reset Driver error Counter
GND	External Ground

RALM (Reset Servo Alarm)

This RALM signal is designed to reset ALM status inside the servo driver if the alarm status can be reset. Please refer to table 3.17 for a description.

Table 3.17: RALM Pins	
Label	**Description**
GND	External Ground
RALM	ALM reset output

CMP (Position Compare)

CMP signals are used to make a comparison between target value and actual value and generate a trigger signal output. Please refer to table 3.18 for the signal name and pin number.

Table 3.18: CMP Pins	
Label	**Description**
CMP	CMP Output
GND	External ground

OUT1 & OUT2 (Digital Output)

Digital output is designed for general-purpose output function. Please refer to the following table 3.19.

Table 3.19: OUT1&OUT2 Pins	
Label	**Description**
DO	Digital Outputs
GND	External Ground

BSY (Motion Busy Signal Output)

BSY signals indicate the current status of the motors.

Table 3.20: BSY Pins	
Label	**Description**
BSY	Motion busy signal output
GND	External Ground

DDA Pulse Output

This section includes OUT and DIP signal:

OUT and DIR (Pulse Output Control)

There are six types of pulse output for PCI-1202. Specify the electrical specification as differential or open collector. Then select DIR/OUT or CW/CCW. Refer to table 3.21 for the pin definition of the DIR/OUT pins. You can also refer to the dipswitch setting in chapter 2.

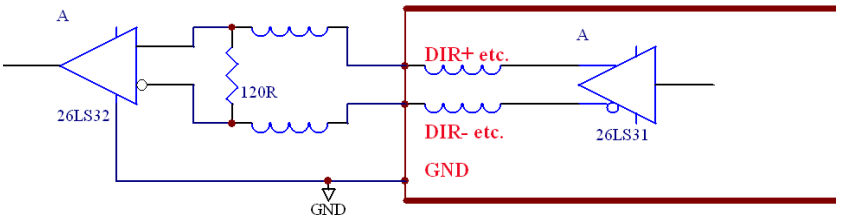

Figure 3.9: DDA Pulse Output

Table 3.21: DDA Pulse Pins	
Label	**Description**
OUT+	OUT(+)
OUT-	OUT(-)
DIR+	DIR(+)
DIR-	DIR(-)

Encoder Feedback Signal

EA, EB, and EZ for differential line driver input. Please refer to table 3.22 for the encoder input signal descriptions.

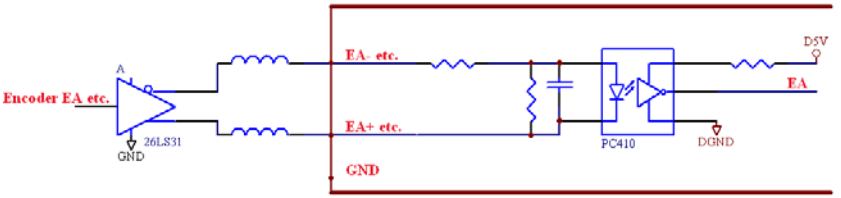

Figure 3.10: Encoder Feedback Input Signal

Table 3.22: Encoder Pins	
Label	**Description**
EA+	Encoder A(+)
EA-	Encoder A(-)
EB+	Encoder B(+)
EB-	Encoder B(-)
EZ+	Encoder Z(+)
EZ-	Encoder Z(_)

CHAPTER 4

Utility Software

Sections include:

- EzLink

Chapter 4 Utility Software

4.1 EzLink

EzLink is a user-friendly utility for the purpose of testing and debugging AMONet. EzLink supports two types of remote slaves: DIO slave modules, and 1-axis motion slave modules.

There are three main steps to make use of EzLink: First, you scan how many master cards are installed in the system. Then you can connect the master and slave devices. After that, you can scan how many slave modules are installed in each ring of the master. EzLink can identify the type of slaves as being DIO or Motion slave automatically and can test their functions.

EzLink is designed to assist in testing system configurations. This can reduce the communication effort between software programming engineers and hardware engineers. You do not have to do any coding during the system configuration testing with EzLink. It is a really helpful tool to both hardware and software engineers.

4.1.1 Minimum System Requirements

PC: IBM PC Compatible with at least x586 CPU

Memory: 128 MB RAM

OS: Windows 2000/XP

4.1.2 Description

Start-up of EzLink

The menu shown in figure 4.1 will be displayed when you start-up EzLink. The menu selection is on top of the display. In the middle is an SDI operation menu. Multiple dialog boxes can be shown in this display. On the top is the tool bar, which can be used to do basic operations. In the left window is an overview of the master card and slave modules that are currently connected. On the right is information about slave modules including slave ID. At the bottom, messages about the system such as communication status and detailed operation information are displayed.

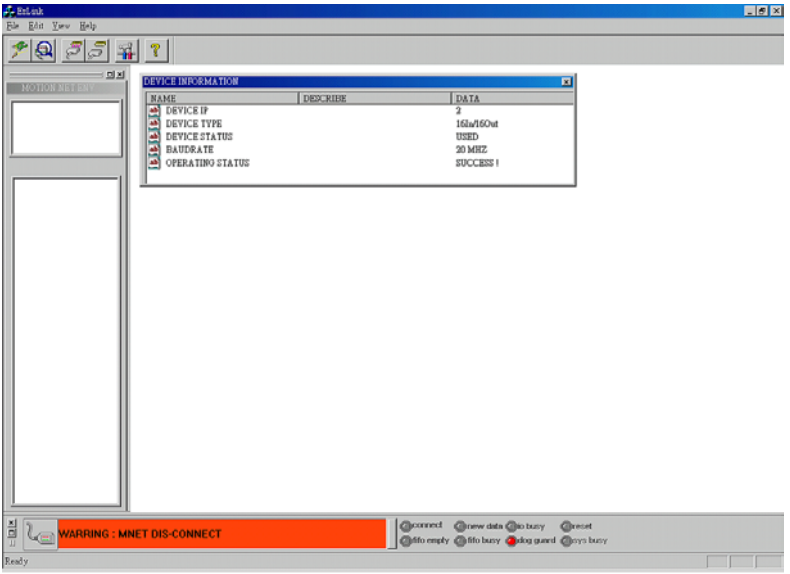

Figure 4.1: Start-up of EzLink

4.1.3 Scan Master Cards

Click on the first button on the tool bar to scan master cards in the system. All master cards will be identified after the scanning is completed as shown in figure 4.2 to 4.5, and all master cards will be listed in the menu.

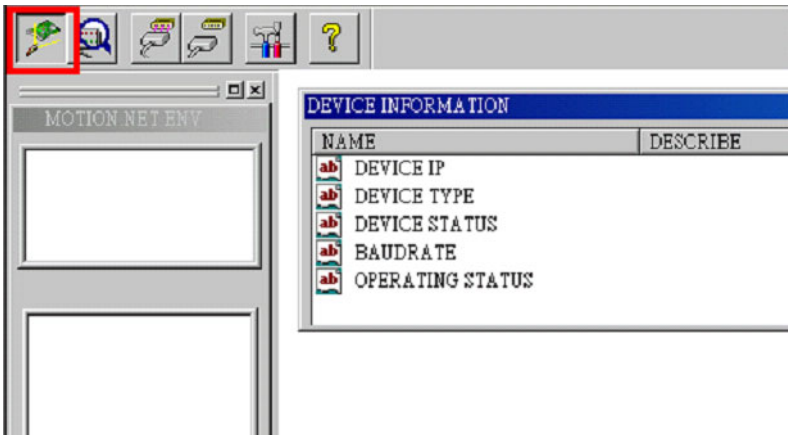

Figure 4.2: Scan Master Cards

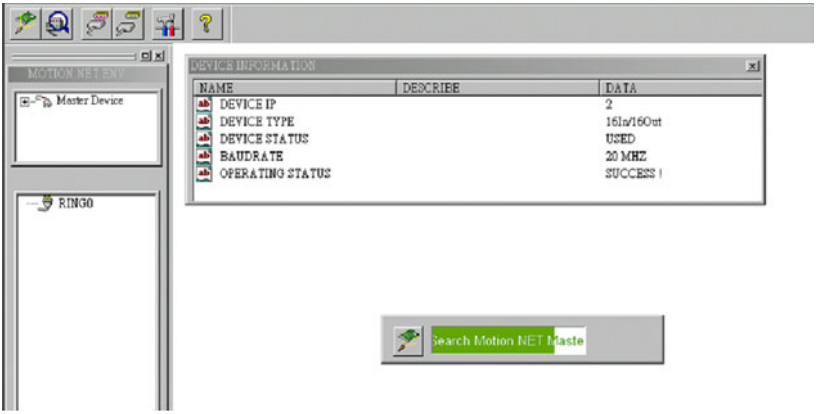

Figure 4.3: Scanning Master

Figure 4.4: Scan is Completed

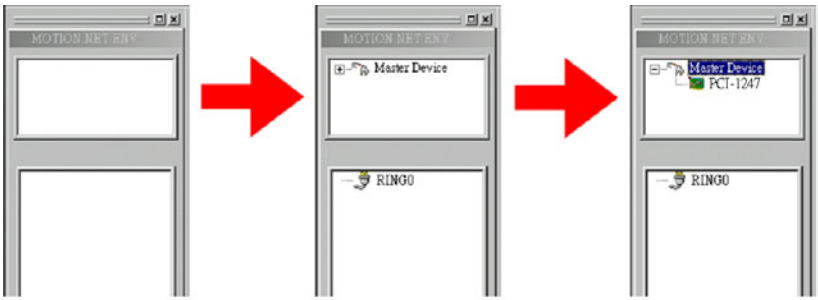

Figure 4.5: Scan Results

4.1.4 Remote Slave Module

After completely scanning the master cards, you can connect the master and remote slaves by clicking on the connect button on the tool bar as shown in figure 4.6 and figure 4.7. Whether the slave is connected or not connected with the master cards can be read from the bottom window that shows system status.

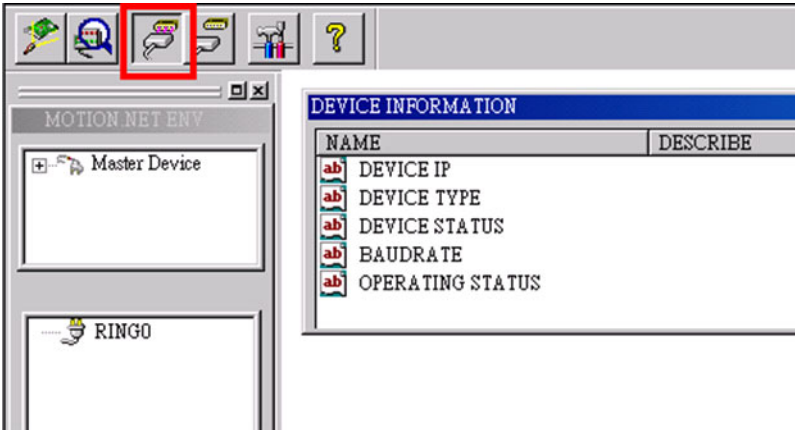

Figure 4.6: Remote Slave Module

Figure 4.7: Status for the Slave Connection

4.1.5 Scan Remote Slave Modules

After the connection between the master and slave has been set up successfully, you can scan the slave modules that are installed in this ring of the master card. Both the number and types of slave modules will be displayed on the left. The slave modules can be either DIO slave or 1-axis motion slave as shown in figure 4.8 to 4.10.

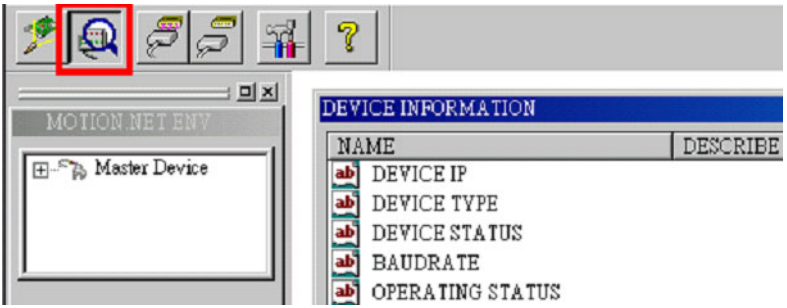

Figure 4.8: Scan Slave Modules

Figure 4.9: Scan Error

Figure 4.10: Successful Scan Result

4.1.6 Slave Module Status Display

All master cards and slave modules will be displayed on the left menu after you have successfully scanned the master, connected the master and slave, and scanned all slaves. Please refer to figure 4.11.

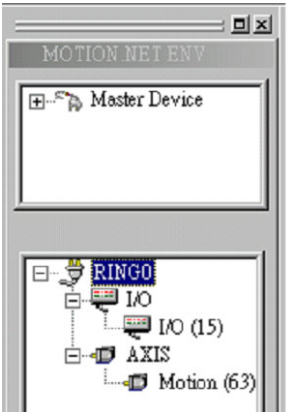

Figure 4.11: Scan Results

You can click on each individual slave module in the menu, the information about the selected slave module will be displayed on the right as shown in figure 4.12. In this dialog box , the ID and Type of the slave module will be displayed.

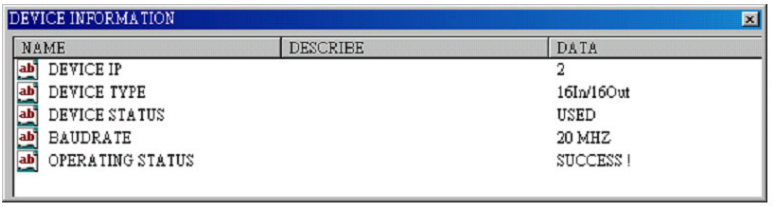

Figure 4.12: Message about the slave module

4.1.7 DIO Type Slave Module

2 types of icons are applied in the operation box of DIO type slave module. The green lamp is for input signal, the red button is for output signal. User can click on the red button and send output signals thereafter. User can read the input status from the green lamp. Please refer to the following pictures Fig.4.13 ~Fig.4-15

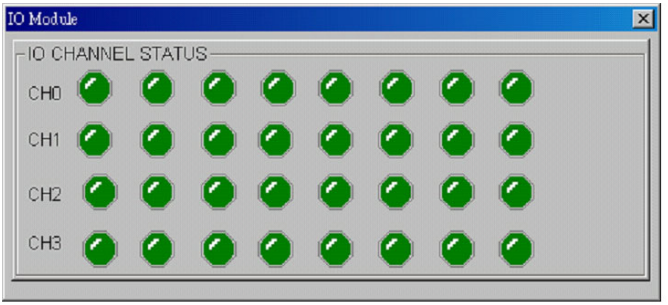

Figure 4.13: DI 32

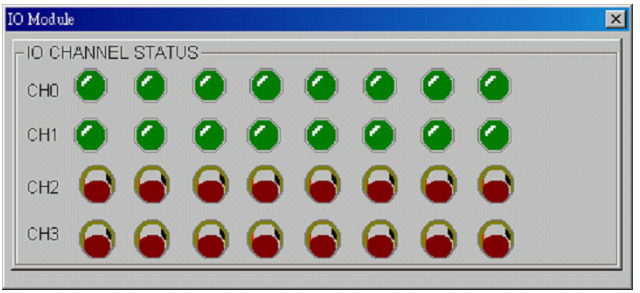

Figure 4.14: DI16DO16

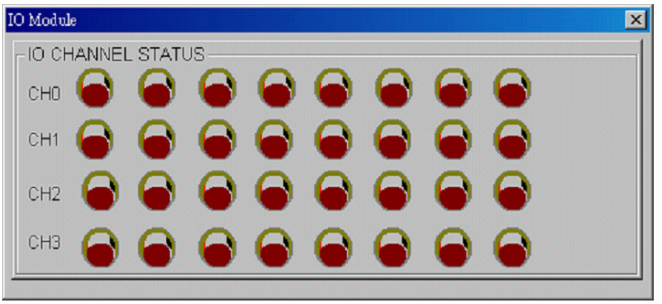

Figure 4.15: DO 32

4.1.8 1-axis Motion Slave

There are 2 menus for the 1-axis motion slave modules. One is for operation , the other is for configuration as shown in the following figures Fig.4.16 and Fig.4.17. Before proceeding to the operation menu , please check the settings in the configuration menus first. Correct I/O configuration settings are necessary for successful operations.

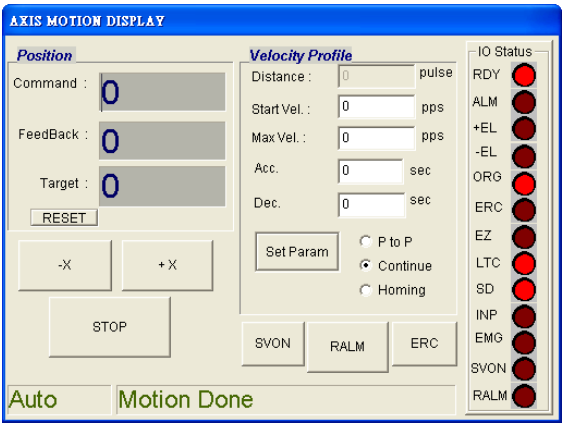

Figure 4.16: Operation of 1-axis Motion Slave

Please check the following settings including ALM, ERC, INP, ORG, LTC, SLD and especially the type of pulse output and encoder inputs.

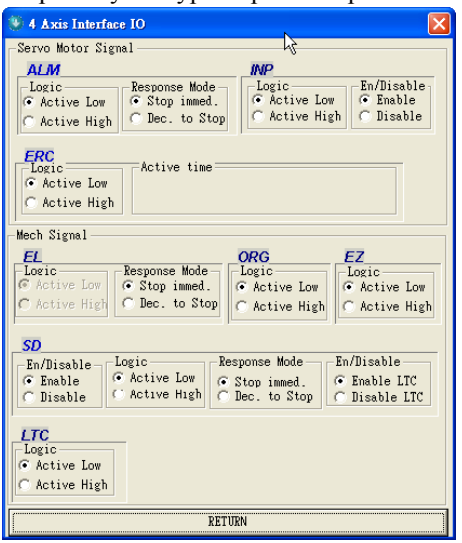

Figure 4.17: Configuration of 1-Axis Motion Slave

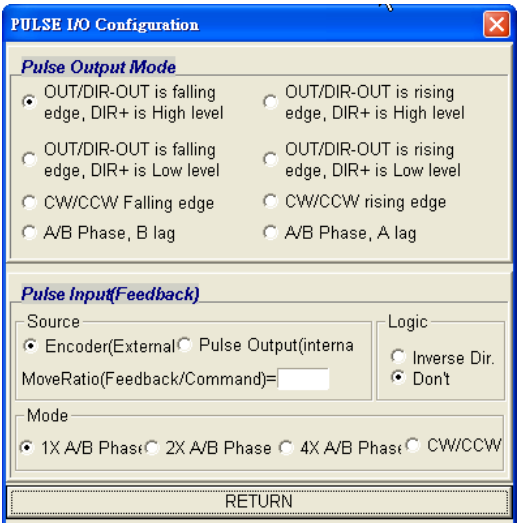

Figure 4.18: Pulse I/O Configuration

You can also set the home function setting in the following dialog box:

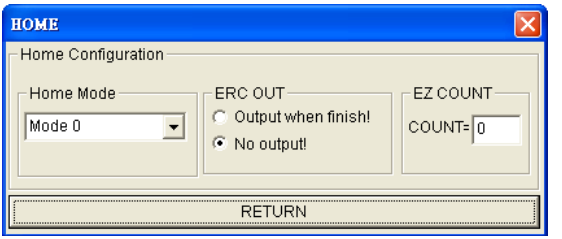

Figure 4.19: Home Function Setting

CHAPTER 5

AMONet API

Chapter 5 AMONet API

This chapter provides a brief introduction to the AMONet API. For more detailed function descriptions and programming examples, please refer to the Programming Guide in the CD.

CDROM\Manual\PCI-1202 Programming Guide.pdf

5.1 Data Definitions

Name	Description	Range
U8	8-bit ASCII character	0 to 255
I16	16-bit signed integer	-32768 to 32767
U16	16-bit unsigned integer	0 to 65535
I32	long integer	-2147483648 to 2147483647
U32	32-bit unsigned long integer	0 to 4294967295
F32	32-bit single-precision floating-point	-3.402823E38 to 3.402823E38
F64	64-bit double-precision floating-point	-1.797683134862315E308 to 1.797683134862315E309
Boolean	logic value	TRUE, FALSE

5.2 AMONet Master Control API

This section describes the API of the PCI-1202 master card, including hardware installation, local I/O operation, and ring operation.

5.2.1 Hardware Installation

"Hardware installation" functions initialize/terminate the PCI-1202 device on your system.

Function Name	Description
_1202_open	Initialize system resource
_1202_close	Release all resources

5.2.2 Local I/O Operation

"Local I/O Operation" functions help you read and write digital signals through the local board port (CN5).

Function Name	Description
_1202_lio_read	Read input value from local 10
_1202_lio_write	Write output value to local 10

5.2.3 Ring Operation

"Ring Operation" functions initialize/terminate the onboard master rings and enable/disable the functionality of the rings.

Function Name	Description
_mnet_start_ring	Start ring communication
_mnet_stop_ring	Stop ring communication
_mnet_reset_ring	Soft reset ring and recorder data
_mnet_get_ring_active_table	Get the active slave table
_mnet_enable_soft_watchdog	Enable watch dog
_mnet_set_ring_quality_param	Set the ring communication quality
_mnet_get_slave_info	Get the slave information
_mnet_get_error_device	Get the first error slave device

5.3 Motion Slave

This section describes the API of the distributed motion/DIO functions, include system installation, homing operation, velocity motion, point-to-point motion, position control and counter, position compare and latch, DIO function and slave module status readback.

5.3.1 System Installation

Function Name	Description
_mnet_m1_initial	Initial The Remote Axis Resource
_mnet_m1_set_pls_iptmode	Set Encoder Input Mode
_mnet_m1_set_pls_outmode	Set Pulse Command Output Mode
_mnet_m1_set_feedback_src	Set The Counters Input Source
_mnet_m1_set_alm	Set Alarm Logic And Operating Mode
_mnet_m1_set_inp	Set INP Logic And Operating Mode
_mnet_m1_set_erc	Set ERC Logic And Timing
_mnet_m1_set_erc_on	Fource ERC Output
_mnet_m1_set_sd	Set SD Logic And Operating Mode
_mnet_m1_set_svon	Set Servo Driver ON
_mnet_m1_set_ralm	Output Servo Driver Alarm Reset.
_mnet_m1_set_pcs	Set PCS Logic

5.3.2 Motion Slave Homing Operation

"Motion Slave Homing Operation" sets/enables the "go home" operation for your remote motors.

_mnet_m1_set_home_config	Set The Home/Index Logic Configuration
_mnet_m1_start_home_move	Begin A Home Return Action

5.3.3 Motion Slave Velocity Motion

"Motion Slave Velocity Motion" controls your remote motors by "Velocity Control" mode.

_mnet_m1_set_tmove_speed	Set A Trapezoidal Velocity Profile
_mnet_m1_set_smove_speed	Set A S-Curve Velocity Profile Move
_mnet_m1_v_change	Speed Change
_mnet_m1_fix_speed_range	Immediately Stop
_mnet_m1_unfix_speed_range	Release The Speed Range Constrain
_mnet_m1_v_move	Accelerate An Axis To A Constant Velocity With Trapezoidal Profile, See Description
_mnet_m1_sd_stop	Slow Down To Stop
_mnet_m1_emg_stop	Immediately Stop
_mnet_m1_get_current_speed	Get Current Speed

5.3.4 Motion Slave Point-to-Point Motion

_mnet_m1_start_r_move	Begin An RelativeMove
_mnet_m1_start_a_move	Begin An AbsoluteMove

5.3.5 Motion Slave Position Control and Counter

_mnet_m1_set_command	Set The Command Value
_mnet_m1_get_command	Get The Command Value
_mnet_m1_reset_command	Reset The Command Value To Zero.
_mnet_m1_set_position	Set The Command Value
_mnet_m1_get_position	Get The Command Value
_mnet_m1_reset_position	Reset The Position Value To Zero.
_mnet_m1_get_error_counter	Get The Command Value
_mnet_m1_reset_error_counter	Reset The Error Counter To Zero.

5.3.6 Motion Slave Position Compare and Latch

"Motion Slave Position Compare and Latch" help you set/control the soft limit/trigger comperator's functions.

_1202_set_ltc_logic	Set Latch Logic
_mnet_m1_get_latch_data	Get Latch Data
_mnet_m1_set_soft_limit	Set Soft Limit
_mnet_m1_enable_soft_limit	Enable Limit
_mnet_m1_disable_soft_limit	Disable Limit
_mnet_m1_set_comparator_mode	Set General-Purposed Comparator
_mnet_m1_set_comparator_value	Check Current Comparator Data
_mnet_m1_get_comparator_value	Set Trigger Comparator Value
_mnet_m1_set_trigger_comparator	Set Trigger Comparator
_mnet_m1_set_trigger_comparator_value	Set Trigger Comparator Value

5.3.7 Motion Slave DIO Operation

"Motion Slave DIO Operation" functions read and write the TTL digital signal via the remote modules.

_mnet_m1_dio_output	Set TTL Output Status
_mnet_m1_dio_input	Set TTL Input Status

5.3.8 Motion Slave Status

"Motion Slave Status" functions give you the information of your remote devices.

_mnet_m1_get_io_status	Get The Motion I/O Status Of MNET AXIS Controller
_mnet_m1_motion_done	Return The Motion Status Of AMONet Motion Slave